

**STATE OF CALIFORNIA  
REGIONAL WATER QUALITY CONTROL BOARD  
CENTRAL COAST REGION**

**STAFF REPORT FOR REGULAR MEETING OF JULY 16-17, 2020**

Prepared on June 16, 2020

**ITEM NUMBER: 9**

**SUBJECT: Amendment to the Water Quality Control Plan for the Central Coastal Basin to Adopt a Total Maximum Daily Load for Total Phosphorus and an Associated Implementation Plan to Address Cyanobacteria Blooms in Pinto Lake**

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**KEY INFORMATION**

Location: Pinto Lake, Santa Cruz County  
Nature of problem: Harmful cyanobacteria blooms  
Types of discharges: Nonpoint source and point source discharges of phosphorus  
Outcome: Adopting the proposed Basin Plan amendment would establish a total maximum daily load and an implementation strategy to reduce phosphorus loads to Pinto Lake thereby reducing the frequency, severity, and toxicity of cyanobacterial blooms.

**ACTION: Adopt Resolution No. R3-2020-0034**

**SUMMARY**

Staff recommends adoption of a total maximum daily load<sup>1</sup> (TMDL) for total phosphorus and an associated implementation strategy for improving water quality in Pinto Lake, located in Santa Cruz County. Reducing phosphorus loading to Pinto Lake is anticipated to reduce the frequency and severity of cyanobacteria blooms. The TMDL implementation strategy describes how the Water Board's regulatory mechanisms (e.g., permits and enforcement actions), and non-regulatory actions (e.g., voluntary actions and grant funded restoration and treatment projects) will address phosphorus loads from various sources in order to attain water quality standards<sup>2</sup>. Staff recommends adoption of Resolution No. R3-2020-0034 (Attachment 1) to adopt a TMDL for total

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<sup>1</sup> TMDL development is a requirement of federal regulations (40 CFR section 130.7). A TMDL report is a written plan which describes how an impaired waterbody will achieve water quality standards.

<sup>2</sup> USEPA defines water quality standards as consisting of three elements: designated uses for each waterbody, criteria to protect those uses, and consideration of the antidegradation requirements.

phosphorus to address cyanobacteria blooms in Pinto Lake and a TMDL implementation strategy for the Pinto Lake catchment.

## **DISCUSSION**

### **Background**

Pinto Lake is a shallow, 103-acre lake located within the Lower Pajaro River watershed in Santa Cruz County (Figure 1). Pinto Lake has experienced nutrient-driven cyanobacteria blooms (Figure 2), associated toxicity from cyanobacteria toxins, and water quality degradation for many years. Phosphorous is the main nutrient that results in water quality degradation in Pinto Lake<sup>3</sup>. As a result of water quality degradation, Pinto Lake is an “impaired waterbody” on the federal Clean Water Act section 303(d) List of impaired waterbodies (303(d) List).

Recent grant-funded restoration and mitigation projects, including alum treatments<sup>4</sup> to the lake bottom, appear to have temporarily sequestered phosphorus in lake bottom sediments, consequently reducing the frequency and toxicity of cyanobacteria blooms since 2017. However, the effectiveness of alum treatments is expected to decrease over time and continuing adaptive lake and watershed management practices and strategies (such as adding alum to the lake bottom) need to be implemented to ensure water quality is protected and maintained.

The goal of this TMDL project is to remove Pinto Lake from the 303(d) List by achieving and maintaining acceptable levels of total phosphorus in Pinto Lake. Reducing the phosphorus loads to the lake is anticipated to result in improvements in the levels of constituents that are sensitive to nutrient and sediment loading including cyanobacteria toxins (i.e., microcystins), algal scum and foam, chlorophyll *a*, un-ionized ammonia, and dissolved oxygen.

### **Data Sources**

To support this TMDL approach, staff used water quality data, land use data, hydrologic data, climatic data, soils data, ecological data, demographic data, groundwater data, and other types of environmental data from public agencies and scientific sources. Data acquisition, compilation, and analyses are described more fully in the TMDL Report and the Implementation Strategy Report (Attachments 2 and 3 to this staff report).

### **Numeric Targets**

Numeric targets represent acceptable levels of pollutants that will result in the desired conditions for the lake. This TMDL project identifies numeric targets for constituents like total phosphorus, nitrate, microcystin, chlorophyll *a*, dissolved oxygen, and un-ionized ammonia. When these numeric targets are met, Pinto Lake can be removed from the

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<sup>3</sup> CSUMB (California State University, Monterey Bay) and RCD (Resource Conservation District of Santa Cruz County), 2013. Implementation Strategies for Restoring Water Quality in Pinto Lake.

<sup>4</sup> Aluminum sulfate, called alum, when added to lake water removes phosphates through precipitation, forming a heavier than water particulate known as a floc. This floc then settles to the lake bottom to create a barrier that retards sediment phosphorus releases to the water column.

303(d) List. These targets are protective of recreation, aquatic habitat, wildlife, and drinking water supply beneficial uses. Over time staff anticipate that the lake will respond by showing improvements in the levels of these constituents as a result of reductions in phosphorus and sediment loading.

### Source Analysis

Sources of phosphorus to Pinto Lake include internal loads and watershed loads. Lake bottom sediments represent the internal loads. This source results from long-term nutrient input to the lake over periods of years causing the accumulation of phosphorus in lake bottom sediment. This sediment-bound lake bottom phosphorus can subsequently be released into the water column by geochemical reaction, decay of organic matter, or by sediment disturbance and resuspension.

Watershed loads of phosphorus to the lake include runoff and groundwater seepage from agricultural operations, residential areas, onsite wastewater treatment systems, grazing lands and pasture, natural background sources, and atmospheric deposition.

### TMDL

Table 1 presents the TMDL for total phosphorus in Pinto Lake. We anticipate that attainment of this TMDL will result in attainment of numeric targets and water quality standards, at which time staff will recommend removing Pinto Lake from the 303(d) List. As previously discussed, treatments appear to have temporarily sequestered phosphorus in lake bottom sediments, consequently reducing the frequency, severity, and toxicity of cyanobacteria blooms. However, alum treatment effectiveness will likely decrease over time. Continuing adaptive lake and watershed management practices and strategies need to be implemented to attain the TMDL.

This TMDL may be achieved in multiple ways including the following:

- Water quality conditions meet all regulatory and policy requirements necessary for removing Pinto Lake from the 303(d) List of impaired waters; or,
- Pinto Lake attains the total phosphorus TMDL (annual total phosphorus loading capacity); or,
- Pinto Lake attains the numeric targets for total phosphorus and/or nutrient-response indicators (i.e., dissolved oxygen water quality objectives, chlorophyll *a* targets, and microcystin targets).

Table 1. Total maximum daily load for total phosphorus in Pinto Lake.

Waterbody	Total phosphorus lake water quality numeric target milligrams/Liter	TMDL total phosphorus load (loading capacity**) pounds/year	Percentage reduction to achieve loading capacity
Pinto Lake	0.17	~200	90%

\*This is an estimated, average annual total phosphorus load to the lake based on watershed conditions and existing land use and does not account for total phosphorus in lake sediments that are temporarily sequestered by the 2017 alum treatment.

\*\* The loading capacity is the greatest amount of a pollutant that a waterbody can assimilate and still meet water quality standards [40 Code of Federal Regulations (CFR) section 130.2(f)]. A TMDL represents the loading capacity of a waterbody.

## Allocations

A TMDL can be thought of as a pollution budget<sup>5</sup>. The TMDL distributes, or “allocates” the waterbody’s loading capacity among the various sources of that pollutant. Pollutant sources that can be characterized as point sources receive waste load allocations; nonpoint sources of pollution receive load allocations.

Our TMDL project approach concludes that major watershed improvement efforts should be directed towards phosphorus control. To that end, total phosphorus allocations are given to both internal loading sources (lake bottom sediment), as well as owners and operators of irrigated lands, municipal and industrial NPDES-permitted stormwater entities, onsite wastewater treatment systems, atmospheric deposition, undeveloped areas owners, and owners/operators of livestock on rangeland and pasture. However, the largest and most significant phosphorus source requiring control measures is the lake bottom sediments. Continued control of this source, in addition to the control or reduction of other watershed sources of phosphorus, is anticipated to result in achievement of the total phosphorus TMDL and water quality standards over time.

## Implementation Strategy

The TMDL Implementation Strategy Report (Attachment 3 to staff report) describes the steps necessary to reduce phosphorus loading to the lake and to achieve the total phosphorus TMDL.

The TMDL Implementation Strategy Report provides a series of actions and schedules for implementing parties to reduce phosphorus loading by regulatory programs, voluntary measures, and grant-funded programs. Details about the implementation strategy are compiled in Attachment 3 to the staff report. A more concise summary of the TMDL Implementation Strategy is found in the proposed Basin Plan amendment pages 6 through 12.

## TMDL Attainment Schedule

Interim Water Quality Milestone: Staff anticipate control of phosphorus will result in attainment of water quality numeric targets for toxicity (cyanobacteria toxins, i.e., microcystins) within 5 years of the effective date of the Basin Plan Amendment (Office of Administrative Law (OAL) approval date).

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<sup>5</sup> A TMDL is defined as “the sum of individual WLA [waste load allocations] for point sources and LA [load allocations] for nonpoint sources and natural background” (40 CFR section 130.2(i)).

Final TMDL Attainment Date: Within 10 years after the OAL approval date, staff anticipate control of phosphorus in lake sediments and within the watershed will result in attainment of the TMDL (as described in the section titled TMDL above).

### **Climate Change**

The Central Coast faces the threat and the effects of climate change for the foreseeable and distant future. To proactively prepare and respond, Central Coast Water Board staff has launched the Central Coast Water Board's Climate Action Initiative, which identifies how our work relates to climate change and prioritizes actions that promote adaptation and mitigation to improve resilience and protect beneficial uses. The Climate Action Initiative is consistent with the Governor's Executive Order B-30-15 and the State Water Board's Climate Change Resolution No. 2017-0012.

In the Central Coast Region, temperatures are projected to continue to increase through the next century, and periodic El Niño events dominate coastal hazards across the Central Coast, but we do not have specific projections of flooding hazard trends in inland regions. An increase in algal blooms is projected and will have detrimental effects on animals and people exposed to associated toxins<sup>6</sup>.

This TMDL project includes a climate change response framework, discussed in more detail in the TMDL Implementation Strategy Report (Attachment 3 to staff report).

This framework is based on policy guidance and recommendations from State Water Resources Control Board Resolution No. 2017-0012 and the Central Coast Water Board staff report entitled "Central Coast Region Response to Climate Change."

### **Human Right to Water**

California Water Code section 106.3, subdivision (a) states: It is a policy of the State of California "that every human being has the right to safe, clean, affordable, and accessible water adequate for human consumption, cooking, and sanitation purposes." On January 26, 2017, the Central Coast Water Board adopted Resolution No. R3-2017-0004 directing Central Coast Water Board staff to implement the Human Right to Water law and to prioritize regulatory programs and activities to prevent and/or address discharges that could threaten human health. This TMDL project addresses the Human Right to Water by improving water quality and protecting human health, domestic animals, and wildlife from exposure to cyanobacteria blooms at Pinto Lake.

### **Disadvantaged Communities**

The Central Coast Water Board implements regulatory activities and water quality projects in a manner that ensures the fair treatment of people of all ethnicities, cultures, backgrounds and income levels, including disadvantaged communities. Pinto Lake is a significant public and recreational resource for residents of the City of Watsonville and the areas surrounding the lake. The City of Watsonville is a designated disadvantaged

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<sup>6</sup> Source: California's Fourth Climate Change Assessment, Central Coast Region (September 2018).

community. Cyanobacterial blooms result in temporary lake closures, preventing some recreational activities. This TMDL project addresses pollutants that have historically prevented community members from safely recreating at Pinto Lake at certain times of the year.

## **CEQA**

The CEQA Checklist and Analysis Report (Attachment 4 to this staff report) provides the environmental analysis required by Public Resources Code section 21159. Analysis pursuant to the CEQA Environmental Checklist suggests TMDL implementation may have some potentially significant adverse effects<sup>7</sup> on the biological resources, wildlife, and to fish habitat (see Attachment 4 and findings 25-28 in Attachment 1). All other categories are less than significant or no impact. The potential significant adverse effects are related to reduced flows from agricultural tailwater and earthmoving activities that could impact aquatic habitat and wildlife. Implementation of the proposed total phosphorus TMDL for Pinto Lake therefore might substantially reduce the habitat of a fish or wildlife species. Reduced flows may occur as a result of irrigation efficiencies, retention basins, or other BMPs that pertain to water management practices. Rare, sensitive, threatened, or endangered species may be present in areas with substantial amounts of regulated flows and agricultural return flows. However, excessive levels of nutrients, low dissolved oxygen, and toxicity due to un-ionized ammonia and cyanobacteria toxins causing water quality degradation are not a desirable condition for the health and long-term sustainability of these species. The TMDL for total phosphorus would result in actions to restore the quality of the waters of the state and protect and restore their beneficial uses, despite the potential for adverse impacts.

Consequently, the Central Coast Water Board is making a statement of overriding consideration and determination as articulated in Resolution No. R3-2020-0034 that the specific benefits to Pinto Lake justify the potential significant adverse environmental impacts. Net benefits to Pinto Lake anticipated to result from TMDL implementation include reductions in the frequency and severity of toxic cyanobacteria blooms, restoration of water quality, improvement to aquatic habitat, improvements to the recreational uses of the lake, and reductions in nuisance conditions at the lake.

## **Anti-Degradation**

This Basin Plan amendment is consistent with the provisions of the State Water Resources Control Board Resolution No. 68-16, "Statement of Policy with Respect to Maintaining High Quality of Waters in California" and 40 CFR 131.12.<sup>8</sup> The adoption of the proposed Basin Plan amendment will not de-designate or limit beneficial use designations, will not relax any water quality standard, and will not result in lowering of

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<sup>7</sup> "Significant effects" on the environment are defined as "a substantial, or potentially substantial, adverse change within the area affected by the project including land, air, water, minerals, flora, fauna, ambient noise, and objects of historic or aesthetic significance" (14 CCR section 15382).

<sup>8</sup> Federal Antidegradation Policy.

water quality. This proposal will result in water quality improvements; therefore, state and federal anti-degradation analyses are not required.

### **Scientific Peer Review**

Independent scientific peer review was conducted for this TMDL project. Three scientific experts were selected by the University of California to review this TMDL project for scientific adequacy; these researchers collectively have substantial research experience in water quality, cyanobacteria blooms, nutrient pollution, lake limnology, and aquatic habitat.

Central Coast Water Board staff incorporated the reviewers' suggestions and insights to improve the technical approach in the TMDL project and implementation strategy in several areas, as described in more detail in Attachment 5 of this staff report.

### **PUBLIC OUTREACH AND INVOLVEMENT**

Public outreach and public involvement are a part of the TMDL development process. Our public engagement process included regular TMDL updates, progress reports, scheduled public meetings, and solicitation of public feedback via our stakeholder email subscription list consisting of over 175 stakeholders. These stakeholders represented a wide range of interests, including agricultural interests, local residents, public agencies, environmental groups, local businesses, researchers, local resource professionals, and others. Further detail about our public outreach and involvement activities are documented in Attachment 2 of this staff report.

#### **Public Comments**

In March 2020, Central Coast Water Board staff distributed notice of an opportunity to provide public comment on this proposed Basin Plan amendment.

Central Coast Water Board staff received three comment letters from:

1. Mr. Robert Ketley, former Senior Utilities Engineer for the City of Watsonville (retired), in an email attachment received April 30, 2020.
2. Mr. Steve Palmisano, Director of Public Works and Utilities, City of Watsonville, in an email attachment received May 1, 2020.
3. Mr. John A. Ricker, Water Resources Division Director, County of Santa Cruz, in an email attachment received May 1, 2020.

Written public comments and staff responses are provided in Attachment 7 of this staff report.

Prevailing public comments generally focused on 1) suggestions for watershed and lake management practices to improve environmental conditions; 2) questions and concerns about the TMDL's source analysis, and 3) questions about how TMDL progress and attainment will be assessed. As appropriate, we incorporated stakeholder suggestions

into the TMDL Implementation Strategy Report; we provided clarification regarding the TMDL source analysis; and we highlighted the expectations for how progress towards, and attainment of water quality standards will be assessed. In general, we identified for commenters the flexibility built into this TMDL project and the range of methods responsible parties may use to demonstrate progress towards environmental improvement. After the public comment period it was necessary to fix a transcription error in a table in the proposed Basin Plan amendment. We changed the erroneous load allocation for lake bottom sediments of 41 pounds to the correct value of 13 pounds. This change does not result in any regulatory consequences or changes to the implementation strategy.

## **CONCLUSION**

Pinto Lake has experienced nutrient-driven cyanobacteria blooms, associated toxicity from cyanobacteria toxins, and water quality degradation for many years. Pinto Lake is on the federal Clean Water Act section 303(d) List for water quality impairments due to cyanobacteria toxins (microcystin), un-ionized ammonia, chlorophyll a, scum and foam, and low dissolved oxygen. Due to the Clean Water Act section 303(d) listings, the Central Coast Water Board is required to adopt a TMDL, and California law requires an associated implementation plan. Phosphorus is the main nutrient that results in water quality degradation in Pinto Lake. Reducing phosphorus loading to Pinto Lake is anticipated to reduce the frequency and severity of cyanobacteria blooms. This TMDL for total phosphorus and the associated implementation strategy for improving water quality in Pinto Lake describes how the Water Board's regulatory mechanisms (e.g., permits and enforcement actions), and non-regulatory actions (e.g., voluntary actions and grant funded restoration and treatment projects) will address phosphorus loads from various sources to Pinto Lake. This TMDL project identifies numeric targets for constituents like total phosphorus, nitrate, and un-ionized ammonia as well as for nutrient-response indicators such as microcystin, chlorophyll a, and dissolved oxygen. These targets are protective of recreation, aquatic habitat, wildlife, and drinking water supply beneficial uses.

## **RECOMMENDATION**

Staff recommend adoption of Resolution No. R3-2020-0034, as proposed.

## **ATTACHMENTS**

1. Resolution No. R3-2020-0034 and Basin Plan amendment
2. TMDL Report
3. Implementation Strategy Report
4. CEQA Checklist and Analysis Report
5. Scientific Peer Review and Staff Responses
6. Notice of Public Hearing-Notice of Opportunity to Comment
7. Public Comments and Staff Responses

FIGURES

Figure 1. Aerial photograph of the Pinto Lake catchment and vicinity.

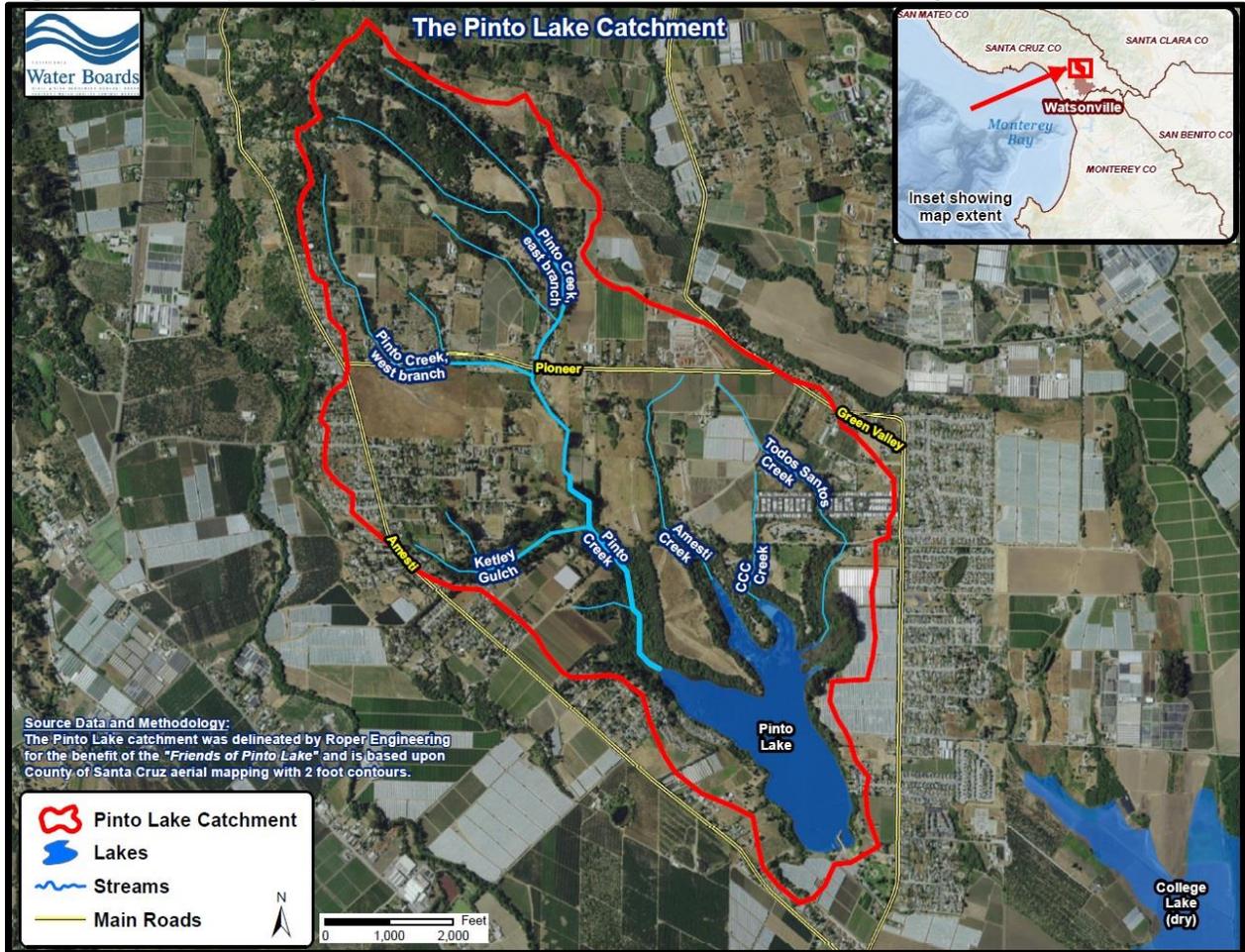


Figure 2. Photo of cyanobacteria bloom at Pinto Lake boat dock, September 2015  
(photo credit: Robert Ketley).

